SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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PHOTOGRAPHS FROM MANUFACTURING DISTRICTS.—No. II.

The Britannia Metal Workers.—These men are known to the trade as "metal smiths;" their divisions of labour are—"Cutters-out," "stampers," "braziers," "buffers," and "spinners." The female workers are called "rubbers." The metal is rolled into sheets previous to being introduced to the manufactory. From these sheets the workman cuts, to pattern, the sizes of plates for the article to be made; it is then put into a die, which gives it its form, and in many cases the ornamental design which appears when finished. The principal amount of skill displayed by the cutter-out is saving the material from waste, called scrap, which requires re-melting before it can be worked again.

The "stamping" is principally a matter of strength. The hammer used is from 4 to 8 stone weight, and works on a pulley. Two perpendicular iron bars enclose it, and the workman moves it to the height of about 6 ft. by means of a rope; his right foot being inserted in a stirrup and his hands grasping the rope, he employs the full force of his body in raising the hammer, which in its fall forms the full impression in the die of the part required for tea and coffee-pots, and the various articles made in Britannia metal: spoons and ladles are exceptions from this process, as they can be cast in a mould, made of brass or some metal equally hard. The brazing business is the soldering of the parts of the article together after they leave the dies. After that comes the buffing department. A buff is a circular piece of wood; an axle is passed through the centre, and the surface is supplied with a covering of very soft leather; this buff is generally propelled by steam-power, and revolves at a very quick rate. A quantity of oil and rottenstone is used to what is called dress it, and the effect is that an even surface is obtained on the articles, which is afterwards brought to a very high polish.

The "spinning" is a plan pursued for making very common goods: a chalk or wooden model is attached to a revolving spindle, and the metal is pressed to that with a pointless tool. When you see the tea-pot which, with exposure to the necessary heat for keeping its contents warm, has shrunk on one side and become a crooked, one-sided sort of object, you may generally conclude it is one which has been made on the spinning plan. In making this common article less regulus is used, partly because of the cost and partly to render the working easier. If you want any Britannia metal articles of furniture, try all you can to avoid those which have been *spun*. The artizans in the Britannia metal trade are generally regarded as very respectable men. Their business is not particularly unhealthy, though it is very dirty in the buffing department: their wages will average 21s. to 36s. per week.

The females, who work at the rubbing business, work with rottenstone and whiteing: the softness of their hands is a great advantage in producing a polish, which, when the material is good, will be little inferior to that of silver plate. The earnings of these females will vary from 5s. to 12s. per week. The workers in the Britannia metal business have not much to complain of, their productions being for the home markets, and also shipped to a large extent. They have generally a pretty good share of employment, and their wages may be called moderate.

The picture of a manufactory is something like the following:—On the ground-floor, ranged before the windows, are the stamps, before-mentioned. Often for convenience the cutter-out is near to them. On the floor above are the braziers; and at a little distance may be heard the eternal buzzing of the machinery used in spinning and buffing. From place to place the men are seen conveying their work. They wear a coarse linen blouse over their clothing, to keep off the dirt and grease in which they work. The girls who work at the buffing business present a very strange appearance; they have generally a handkerchief tied over the head, perfectly close, partly to keep their hair clean, and partly to keep it from being entangled in the machinery. When that precaution has been neglected some most heartrending accidents have occurred. Passing from the rubbers' department to the warehouse, the beautiful polish which the articles have received is rendered still more admirable by the process of wiping with soft wash-leather; and then there is the final casing of the articles in tissue paper, then in strong brown paper, with the label of the manufacturer. Sometimes there is also an engraving of the manufacturers' works, and often some portions of the neighbourhood. Somehow, the "little master," or small manufacturer, is less known in the Britannia metal trade than in many other businesses. That may be accounted for by the fact that the cost of materials, and the expense of working tools, will not permit a man to succeed, now competition is great, and new patterns require change of costly dies, unless he has some substance to rely upon. The houses now holding a good position in the town of Sheffield, and those who have transacted a very respectable business (besides the firm of James Dixon and Sons), are Broadhead and Atkin, two highly respectable and intelligent tradesmen, who worked industriously and successfully for years, until a lamentable affair happened, which, though it in no way affected the commercial position of the house, threw a gloom over those who were immediately connected with it, and in many respects deprived society of a valuable member.

Shaw and Fisher.—These very praiseworthy men shaped their own fortune, and became the proprietors of a very excellent trade, but a proprietoress deserved no small portion of credit for her industry in the warehouse, which was continued when their circumstances would afford other help. It would not be possible in these short Photographs to mention every manufacturer and manufactory in the Britannia metal trade. Some not named exist, and quietly pursue a respectable and remunerative trade.

In the spoon trade, a large amount of business has been done in Bowling-green-street by a single individual, whose exertions have collected a very creditable proof of what diligence can accomplish.

Birmingham never rivalled Sheffield in Britannia metal goods, but now competition has fairly commenced in the electro-plating business, which, as it stands connected with the silver-plating trade, shall be described in our next Photograph.

It is only an act of justice to remark that the masters in the Britannia metal trade have pursued an honourable career; that from them the highest municipal offices in the town have been filled, and we cannot call to mind one instance of bankruptcy amongst them. That the workmen are generally steady, intelligent, and frugal; some of them very useful in the work of voluntary education, and themselves in comfortable circumstances—purely the result of their own exertions—there is plenty of evidence to prove. The Britannia metal trade illustrates one of the most important questions the politician and moralist have desired to see successfully solved—viz., the legitimate employment of women. The promiscuous association of males and females in manufactories is one of the banes of society; where that exists there are frequent instances of irregularity, if not consummate depravity. If women are to be industriously employed, it should be under regulations which propriety can justly sanction. In the Britannia metal manufactories there are two classes of female operatives—the "buffers" and the "rubbers;" the former employment is man's rightful duty; the latter, men cannot perform, for reasons already adduced. A comparison between the women employed as buffers and those who are engaged as rubbers is almost impossible; another order of creatures is scarcely a sufficient term to convey a distinct idea. Intellectually and morally they claim a degree of superiority, and, in appearance, frugality, and domestic worth, they are greatly in advance. The reason is, employment will impart its features, and associations will have their influence, in spite of all admonition or example.

It is not every manufactory that has his own steam-power, but rooms are often engaged at the public grinding-wheels, where the women have to work. The periods when the steam-power is stopped, for dinner time and other causes, place these females in the most dangerous society, which must exert an influence over them seldom, if ever, wholly counteracted. But on the other hand, those who work at the rubbing branch, from their proximity to a carefully and respectably managed warehouse, acquire, in some instances, very superior manners, and cultivate habits of industry and virtue, of which their employers have the most ample reasons to be proud. It would be rather difficult to state the number of persons employed in this department of our commercial system, but they cannot be much less than two thousand, if we take into the calculation men, boys, and women.

John Bennett.

FOREIGN MINING—No. II.

LOMBARDO-VENETO PROVINCES, BRAZIL, CHILI, FRANCE, MEXICO, MOROCCO, HONDURAS, SIAM, &c.

Honduras, to which we are now going to direct attention, is rich in mines. The department of Comayagua, which lies in the centre, has abundant mineral wealth, but at present very few mines are worked within its limits. The department of Tegucigalpa is also exceedingly rich as regards mineral substances, and by far the greatest part of the silver exported from Honduras is raised in the mines of this department. Olancho, another department, has some very rich mines, some of them of gold; but this metal chiefly occurs in the beds of the rivers, all of which carry gold of the purest quality in their sands, but very few of the inhabitants employ themselves in gold washing, their chief occupation being that of breeding and tending cattle. Choluteca has several rich silver mines, only two or three of which, however, are now worked. Mr. Hall, Her Majesty's Consul at Honduras, observes—"Although mines constitute the principal source of wealth in this republic, little can be said on this topic, owing to the want of any statistical information, and the neglected state in which this, as well as every other branch of industry, has been suffered to remain. There is no doubt that when a development of the latent resources of Honduras begins to take place, mining will be the most interesting and important pursuit, on account of the abundance and richness of the metalliferous veins which are found in various parts of her territory. The amount of the mineral products of Honduras may be estimated at from $200,000 to $300,000 worth a year. As there is no tax levied on the exportation of the precious metals, it is not possible to ascertain the exact value it amounts to; but I think the above figure is the most approximate of the annual average value of these products, all of which are taken out of the country, there being no mint in the state, and the use of gold and silver wrought articles being very inconsiderable. In the latter times of the Spanish dominion the mines yielded, according to the best authorities, on an average from $2,000,000 to $3,000,000 a year. This productiveness was the result of the state of quiet which was enjoyed then, but since the emancipation from Spain the long series of revolutions which have devastated this country have been gradually diminishing the importance of mining, until it has dwindled to the comparatively insignificant state in which it is at present found—a condition which has been brought about solely by the agency of war, seeing that all the mineral districts are, with the exception of a few old mines which have been worked out, in a virgin state. Even as it is, the precious metals constitute, as I have said before, the principal item in the exportations of this country, although, as may be supposed, the system by which this produce is raised, without proper machines for draining the mines, or for extracting, crushing, and reducing the ores, is a very rude and defective one. There is a multitude of mines of acknowledged richness lying in an abandoned state, from the inability of the inhabitants to work them, whereas, if operations were to be established on a judicious and proper plan, they might be made to yield large profits. Properly speaking, there are few gold mines in Honduras as yet discovered, but gold occurs abundantly in some of the rich silver mines, in most of which, in fact, the silver is found in combinations with gold, iron, lead, zinc, antimony, mercury, sulphur, &c. Most of these mines are situated along the chain of mountains which lie on the Pacific slope, while gold dust and some gold mines are to be found on the Atlantic side. Gold, according to all accounts, is found in great quantity, and of the best description, in the beds of all the rivers which flow into the Atlantic, and the washings in these places are represented to be highly remunerative. Men and women employ themselves during certain portions of the year in gold washing, and they sell the gold dust at from $11·50 to $12 the ounce. By far the greatest part of the gold exported from Honduras is raised in this way from the Rivers Guayape, Jalan, and Manguile, in the department of Olancho, where it is found of the purest and most excellent quality, as likewise in those of Yaguale, Sulaco, Pacaya, and Caimito rapids, in Yoro. Minas de Oro, a village in the northern part of the department of Comayagua, is, as its name implies, situated in a particularly auriferous district, the precious metal being found not only in veins of a very rich character, but also in beds and fragmentary deposits along a number of streamlets and small rapids, flowing into the Sulaco river. In this district are situated the copper mines which furnish all the metal used for the mintage of the provisional currency; and gold is here also found to exist in a considerable proportion, as has been found by washing the dust obtained in the process of bruising the copper ores. There are also some very rich copper mines in the neighbourhood of Santa Barbara, and a wealthy and intelligent native is about to establish operations for working them, with the view of exporting the metal—a scheme for which the proximity of the Rivers Sulaco and Humuya offers great advantages, both running to the Ulua river, which discharges in the Atlantic at a few miles from the port of Omoa. There are also some rich copper mines in the department of Choluteca, situated near the ridge of mountains running along the coast—a circumstance very favourable to their exploration. Opals form another important item of the Honduras mineral riches. There are a great number of mines in the department of Gracias, and many of these precious stones are exported every year, the value of which is, nevertheless, inconsiderable, from their being sent in the rough state. There is, however, a French miner and lapidary working a mine at Erandique, who is reported to be realising a large fortune by exporting polished opals. Iron ores are also abundant, but only one or two mines are being worked at present, and the little iron produced is scarcely sufficient for the home demand. The following metals and minerals are found in the State:—Coal, limestone, platina, zinc, tin, amianthus, cinnabar, &c., but as yet nothing has been done to bring about a proper exploration of these riches. The arts of peace being all but ignored in Honduras, the precious metals have absorbed all the attention of those who have devoted themselves to mining pursuits. The Government has at various times tried to give a stimulus to mining, by securing certain privileges to persons engaged in this branch of industry. By a decree dated March 16, 1843, mine proprietors were allowed to work their mines as they thought best, thus abolishing the old restrictive Spanish law, which enjoined mining operations to be conducted on a given and unprofitable method. Decrees have at various times been passed, exempting men engaged as miners from military service. These laws have worked out very well in time of peace, but the moment a revolution breaks out they are invariably disregarded by the military authorities. In consequence of the insecurity arising from these perpetual wars and other drawbacks, such as the scarcity of labourers, the want of capital and scientific appliances, the natural indolence of the Spanish-American race, and the total want of roads for the conveyance of machinery adapted for the proper working of the mines, most of the enterprises which have been established involving an outlay have met with signal failure. In some of these foreigners have been engaged, and foreign capital invested, but at present all the mining is in the hands of the natives, with two or three exceptions. One of them, the Cuyal Mine, situated at a few leagues from the Pacific, is worked under an association formed in London, called the Cuyal Mining Company, but as yet the operations in it cannot be said to have been properly established. From the richness of the mine (yielding from 70 to 3245 ozs. of silver per ton), and its local advantages, this undertaking, if properly followed up, will, no doubt, turn out a very profitable one. There is another mine in Tegucigalpa, called Guasueuran, worked by an Englishman, which yields the enormous proportion of from 200 to 8000 ozs. of silver per ton."

In Mexico, the whole coast range of Sinaloa is studded with mines of the precious and other metals, especially with silver mines, upon the produce of which this trade principally depends. Most of them have been worked in a rude manner, with very little expenditure of capital in machinery, the extreme richness of the ores compensating in some degree for the defective system employed. A few years of peace and freedom from interruption would, no doubt, encourage the investment of capital in modern improvements and appliances, and set many of the best mines again at work. The permission to export uncoined silver—at present prohibited—at a moderate fixed duty, treating it like any other article of produce, would also lead to an augmented production, would put an end to its contraband export from the coast, and confer an inestimable benefit both on the miner and upon legitimate commerce. The discovery of the quicksilver mines of New Almaden, in Upper California, was expected greatly to have stimulated the production of silver on this coast, through the cheapening of that principal ingredient in the amalgamation process of extracting the silver, which method is here in almost universal use. However, notwithstanding that within the last ten years the price has fallen from $160 to $55 per flask of 75 lbs., it has not produced that effect, which must be attributed to the cholera, which thinned the population, bad harvests which prevailed for some years, and much more than all other causes combined, to the political troubles which have interrupted labour, and counterbalanced the advantages of the cheapening of that requisite. Copper mines, which are numerous and rich in the state of Sinaloa, have hitherto but slightly attracted the attention of British capitalists. Although for some years past Mazatlan copper has been known in the English market, until lately no steps have been taken to ascertain, by local investigation, what facilities there were to increase the supply. The district of country (says Mr. Thomson, the reporter on the subject) in which copper mining is carried on has lately been visited by professional Englishmen, having a technical and practical knowledge of the subject, and their report is exceedingly favourable, both with respect to the number of mines met with, the description and richness of the metal, and the facilities for working it. The latter is greatly aided by the different classes of ore obtainable, which, combined, assist each other in the smelting process, and a suitable flux has also been found near the copper mines examined. The principal mine now worked is that of Jesus Maria. The smelting has hitherto been carried on in a primitive manner, in small ovens, supplied with bellows moved by men. The copper left in the slags, through imperfect reduction, is estimated at 10 to 12 per cent. The lode is described as very rich, and from 20 to 30 yards wide. At the period of the visit of the persons alluded to, about 2500 tons of ore were ready for smelting, of an average richness of 30 per cent., and in another part of the works about 1000 tons, of 60 to 70 per cent. ore, were visible. The latter was composed of grey ore, with large spots of native copper and black oxide, and some crystals of the red oxide. The other portion of the ore was found to contain green carbonate, sulphurets of copper mixed with iron ore, and some crystallisations of sulphate of copper in the rich brown copper; the whole lode may average from 15 to 18 per cent. The other mines examined in the same range of the Sierra, though they vary in quality, present the same characteristic appearance as the one described. The principal drawback to the working of the copper mines in this district is their distance from the coast, and expensive mule carriage being incurred in transporting the copper thither, the distance being about 55 leagues, and the expense of mule hire $2 to $2½ per quintal. Nevertheless, if the present rude operations give returns sufficiently encouraging to induce the proprietors to continue working the mines, it appears a fair subject for the consideration of capitalists whether the application of the improved methods of smelting and refining, practised at Swansea, would be attended with results sufficiently profitable to warrant the investment of the capital necessary for the erection in this country of suitable smelting works, and of sending out a staff of English miners to direct them. The facility of shipping the copper to Great Britain is very great; the vessels which load Lima wood readily receiving it for ballast. The rate lately paid has been 40s. per ton.

Of the provinces in the neighbourhood of Mogodore (Morocco), one of them—Sous—is said by the natives to be rich in mines of copper, iron, lead, sulphur, and even silver, but they are not worked to any extent, for fear of the Government. Of the yield it is almost impossible to form a conjecture. Some persons from Ait Baha state that copper and lead are to be had there nearly pure, almost on the surface of the ground. In one spot there appear ruins of foundries of ancient date, in buildings now buried underground, in which much pure copper is found. Ait Baha is from 25 to 30 miles from the sea, and there are other mines about 20 miles further inland. All information on the subject being, however, obtained from the natives, its accuracy cannot be guaranteed. The province of Tangier, and more especially the district of Anjerr, which extends along the coast of the Straits to the neighbourhood of Ceuta, abounds in coal, antimony, lead, copper, manganese, and other mineral productions. Symptoms of silver have also been occasionally discovered there. The Sultan strictly interdicts all mining operations in this country. Per-

mission to dig mines in the vicinity of Ape's Hill has, nevertheless, been accorded on some occasions to private individuals; but whenever such a grant has been made, it was always accompanied by a stipulation, that in case gold or silver were found, the place of the discovery should be immediately closed up, and the search for ore transferred to another site. About four or five miles from Tetuan, rich veins of copper ore have been discovered, which a French company attempted to work, but from want of capital, or proper overseers, the speculation failed. Specimens of antimony, manganese, and lead, have also been found in the mountainous districts to the north-west of Tetuan.

Mr. H. J. Moyle, of Cornwall, a gentleman who has been travelling in South Africa, was attracted to Siam, by its novelty, and the facility of exploration disclosed by the recent treaty. He reports as follows:—"The country along the banks of the River Chan Phya (Meinam) as far as Nophburi and its environs, in latitude 15° 25', is covered with alluvial deposits, or a mixture of these and diluvium. The hilly and mountainous districts extending north and south in this latitude, and running many hundreds of miles in both directions, contain many valuable and rich mineral productions, though the natives do not avail themselves of them by working mines. In these hills I detected several rich and valuable veins of copper ore, principally in grauwacke. I considered them of so much value and importance that I applied for and obtained permission from the Siamese Government to work them for five years, on payment of a royalty of one-tenth of the ores to the Crown of Siam. Lead and silver ores I also discovered, as well as enormous beds of magnetic iron ore, and specular iron ore. The country to the north is carboniferous limestone, with positive indications of the existence of coal. The rivers, creeks, and canals with which this country abounds, extending in many places to the base of the hills, afford great facilities for transport, &c. I am impressed with the opinion that, should a fair portion of encouragement be given, the country of Siam will rival, if not surpass, any country of the East in the richness of its mineral productions."

ROCKS AND MINERAL DEPOSITS OF NAMAQUALAND.—No. IX.

There is, perhaps, scarcely another country where a less amount of alluvial soil and drift detritus has been developed than in Namaqualand; and this is evidently owing to the scarcity of water in that country; for only the few "oases" where there occurs some vegetation contain generally one or more, though mostly only small, springs; and those alluvial basins on higher levels, where the natives grow a scanty supply of grain, are, in addition to the springs of water which they contain, supplied with a great deal of moisture by mists or stratus clouds, hanging frequently over them. In other spots where there does not occur a spring, but where the slopes of several surrounding masses of rocks do meet, there is deposited a bed of reddish, highly arenaceous clay. The remainder of the surface, excepting where covered with sand, is formed by barren rocks. Although we may obtain water in most places by digging to a more or less considerable depth, still the water thus obtained appears to be almost standing still in the reservoirs thus opened—such reservoirs, in many cases (*i. e.*, in many of the sandy river beds and other low levels covered by sand), being nothing else but subterranean pools; and it is probably owing to this want of activity of the water that most of the water found in Namaqualand has a brackish, and in many parts (especially where albite predominates in the surrounding rock) a salt taste. I was frequently struck by the meridional directions of a series of fountains, or rather spots, where a (generally scanty) supply of water issues from the ground; there occur—*e. g.*, several small springs on a line to the north of Kodas fountains—a few spots with water to the south of the same; then further south, but on the same meridional line, the fountains of N'Omies, and still further south from there, several more fountains, &c., all disposed in one meridional direction; and such, in fact, may be noticed in numerous other parts of that country, an investigation of such water fissures being comparatively an easy task, especially if the investigator is of a nature as not to care about bodily fatigues and sensual wants—for all such investigations have to be made on foot.

Bands and veins of quartz and other impermeable minerals, when running across such fissures, appear, according to their position and dip, to exercise a considerable influence upon such water fissures, especially upon the level on which the water issues on the surface—for example, to the north of a quartz band which runs across (from east to west) a portion of the Upper Schaap River basin, near the Weyport Mines (abandoned); there occur several fountains on the north side of the hill, as well as on the south side of it, and also pools of water in the bed of the river, but no trace of water is found on the south side of that band of quartz, though the ground slopes towards the south side; and I dug to some depth into the sand of the river bed, to the south of that quartz band, without finding any water.

One instance is worth noticing, as illustrative of the great influence which a greater supply, and, consequently, a greater activity of moisture, of water, would have upon the surface appearance of that country. There may be frequently noticed, in many localities, long yellowish or reddish stripes, running down the steep sides of mountain ranges for a considerable distance, and on ascending to them, we find them to consist of clay (and sand), with numerous fragments of stones, generally all of an uniform colour, and about the same size and shape as the stones which have been broken up for roads; and I ascertained from old natives that this phenomenon had taken place about nine years ago, when there fell an extraordinary heavy rain in that country, in consequence of which large masses of rock got loosened, and rolled down the mountain side.

To the small quantity, and to the want of activity, of the water contained in the subterranean reservoirs, and to the want of the atmospheric agency of moisture, must naturally be ascribed that characteristic barrenness, and that great scarcity of alluvial soil in that country; and in looking at any other mineral country, and noticing there an abundance of water, of alluvial soil, a perfect development of all the rocks, no thin bands of basaltic, &c., rocks, traversing a syenitic mountain like a network, such as is frequently noticed in Namaqualand, but instead of that whole bulky masses of basalt, such as would be found if all the various bands of basalt had extended and grown in breadth till they all met—for example, the basaltic mass of the Pochlberg, in Saxony, &c.; a continuation of mineral deposts to a considerable depth, their tops being frequently decomposed by the excess of surface agencies; and, if we compare with all that the scanty supply and inactivity of the waters in Namaqualand, the scantiness of alluvial soil, the great barrenness of the rocks, and their very imperfect development—the want of alluvial soil appearing to correspond with the want or exceedingly imperfect development of many rocks of segregation—the shallowness of its mineral deposits, &c., we cannot help arriving at the conclusion, that aqueous and atmospheric causes of geological change must have a very considerable share in the metamorphoses of mineral substances, in the formation especially of mineral deposits, and that, like the presence and circulation of the blood in the human body, is an essential condition for the growth and development of all the various parts of that body, so the presence, activity, and the circulation of the water in the rocks of our earth appears to be an essential condition for the development of various mineral substances, and more especially for the development of mineral deposits.

All the practical observations which were made in geology, and is making which the observer looked more at, and was guided by, the objects of his observation rather than by prejudicial theories, appear to point to that great agent as the probable cause of "mineral life," which is known to us as "magnetism," and the intimate connection of which with geological phenomena has been pointed out by Mr. Evan Hopkins; and as the plan of making geological investigations which has been adopted by that gentleman, promises to insure a certain and sure advancement of the science of geology, by preferring the safe, though occasionally roundabout and difficult, path of practical investigation, on which path we can always ascertain whether we are right or wrong by the conspicuous land-marks of facts, and on which path the as yet feeble, and, owing to having been so often frightened by hypothetical hobgoblins, rather nervous science of geology is supported by stronger companions—mathematics and chemistry, it is certain that all those theories which at present render many doctrines of geology uncertain, unreliable, and vague, will in time be excluded, and be looked at in the same light as we now look on many of the "very learned" explanations of ancient alchemists, in whose doctrines such agencies and causes which were quite beyond the reach of observation, played often as conspicuous and important a part as the supposed "geological periods of awful heat," frightful cosmical catastrophes, &c., form in many of the hypotheses of geology even at the present day. That Mr. Hopkins meets with very great opposition on the part of many scientific men is not at all surprising; our present age would, indeed, be such an enlightened age, as not only to be called so by ourselves, but even by future generations, if the first propounder of a new, though exceedingly clear and simple doctrine, should not meet with the same obstacles and opposition that fall to the lot of almost every pioneer in science.

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The above papers are an attempt to give a rough sketch, a general outline, of the principal geological features of Namaqualand, in which some of the details which are given may serve as indicative, or more expressive, of the different features. I did not give to those papers a strict logical and systematical arrangement, thinking that by giving them in the above rough way it would be easier for other more experienced and abler men than I am myself to discriminate between that which is true and that in which I might have been under erroneous impressions. I trust that what I observed I observed well, for a strong enthusiasm rendered me utterly regardless of all fatigue and privation in pursuing the object in view.

JULIUS.

GOVERNMENT SCHOOL OF MINES.

On Monday, Mr. WARINGTON SMYTH commenced the course of lectures on "MINING" for the ensuing term. The lecturer observed that in order to acquire a perfect knowledge of mining, it was necessary that the students should have some acquaintance with the sciences allied to it, such as physics, applied mechanics, metallurgy, geology, mineralogy, and chemistry. The lecturer, as he proceeded, briefly and succinctly pointed out the several advantages to be obtained by the acquisition of these important branches of mining education. An individual might, by the study of the pure sciences alone, acquire a considerable amount of information; but he would inform them that, if they were to become managers of mines, the most indispensable thing required was practice, and this could only be attained by experience and practical knowledge, gained at the mines. They would, no doubt, derive some benefit from these lectures, as it was always interesting and useful to know how things had been previously done, and there were many who, by observing the errors of their predecessors, often avoided the mistakes which they had made. In general, most people liked to acquire knowledge, and it would often be found that it was of the greatest utility on occasions to know a little more, either by reading or scientific teaching, than one had previously been acquainted with. The duties of a manager of a mine were of a most arduous character; he required to possess a deep insight, an acquaintance with the various phenomena of mineral veins, and the several methods by which these were to be worked. It often happened that individuals who visited mining countries merely, in many instances, took a superficial glance at particular isolated spots where chance had led them, and afterwards denominated them the mining districts of that special country. They might just as well, when talking of English mining, cite as examples a small Yorkshire colliery, or some of the little lead mines of North Wales. The same remarks would apply to the Continent, if they alluded to a speculative mushroom mine, either on the Rhine or in France.

He had, on the map of Europe, which was before them, marked out those localities where mines appeared to be most prevalent. Taking the metalliferous districts, they would perceive Cornwall and Devon, and the mines of South Wales; then, further up, the lead mines of Derbyshire and Yorkshire, as well as those of the border counties of Northumberland, Cumberland, and Durham. In Ireland, although there were many places where minerals were being worked, yet, perhaps, it would be sufficient if they merely took in that portion of the country which extended from Wicklow to Waterford. With regard to coal fields in England, they would perceive those of Bristol and Bath; passing further up, the coal fields of the Forest of Dean, those of the midland group comprising Warwickshire and Derbyshire; from thence to the North of England and the large area in Scotland, extending between Edinburgh and Glasgow. In Russia, they would perceive the locality of Ekatherinburg, in the Ural Mountains. Crossing the Channel, we come to the classic mining ground of the Hartz; this had some interest for Englishmen, as they would remember that for a considerable period Hanover had been governed by the same sovereign as England. Other noted localities were Freiberg, in the upper mountains of Saxony; Przibram, in Bohemia; Schemnitz and Kremnitz, in Upper Hungary; as well as several parts bordering on Transylvania. In the Austrian Alps there were some large mines, and Tuscany had lately become a district of importance. In Spain, he had not marked out any localities, for although it was a mineral-producing country, yet there was no place where a number of mines were aggregated together. Among the continental coal fields, they would perceive those of France and Belgium, Westphalia, Saarbruck, on the Rhine, and St. Etienne, in the south of France.

One of the most important subjects to which the students' attention could be directed was the description of the several localities, and the peculiar conditions in which minerals occur, either in veins or lodes. Some well executed models by Mr. Sopwith were shown, and a diagram of the Levant Mine described. In our metalliferous mines, great knowledge was required to fulfil all the requirements; there was raising of the water and material, as well as the providing of ventilation for the men. In collieries, which were worked on different principles, the roadways, &c., had to be maintained. In both cases great difficulties had to be contended with, which it was not necessary there to expatiate upon. There was great similarity in the conditions on which mines were allowed to be worked in all countries, and the laws on this subject, though somewhat complicated, possessed a considerable uniformity. The surface land in many instances had been given for military services and other purposes, but in general the minerals were excepted, and kept as a property for the people—in Germany, for instance. In Austria, the mines were managed by a set of officers appointed by the Government. In Russia and Turkey, to the present day, the minerals are the property of the Government, while in this country they belong to the surface owner; gold and silver, if worked alone, can be claimed by the Crown. In France, during the great revolution, the great number of the small holders was felt so prejudicial to the welfare of the mines that a law was passed to ameliorate this unsatisfactory condition. On the Continent, a number of mines were worked by the Government, or they were leased to individuals, the working being carried on under supervision, and the officials introducing a number of checks, the object being that a mine should be lasting. In England, another method was pursued, which was to open a mine as quick as possible, and gain as much money in the shortest time; this certainly displayed greater activity, but it was often the means of affording scope for deception, and they were continually hearing recitals of mines being abandoned at a heavy loss; where the profits were limited it was considered this was much better for the community, although the adventurers might not reap so much gain. In working a mine, it should be looked on as an investment, and not a speculative undertaking; it was this plan which was followed out by Mr. Beaumont, at his extensive lead works, at Allenheads, and there, for several generations, a steady and orderly population had existed.

The lecturer then alluded to the antiquity of tin mining in Cornwall, it being well known that the Phœnicians traded there for that metal. The system and inconvenience of tin bounding was explained, as well as the mode of taking up mines in Derbyshire, and the measuring in Germany, as related by Agricola, who wrote about 1530-40. The special peculiarities connected with various localities would be dilated upon when he came to their consideration.

On Wednesday, the lecture by Dr. PERCY was on "Fuel." The subject first treated of was the composition of bituminous coals. A very elaborate report on this had been drawn up by Dr. Playfair, for the Lords Commissioners of the Admiralty. He would now give them the composition of several sorts of coal. The first was that of the Wigan Cannel coal; its specific gravity was 1·276; carbon, 80·07; hydrogen, 5·53; oxygen, 8·09; nitrogen, 2·12; sulphur, 1·5; ash, 2·72; water, 0·91. The next was the Edinburgh Parrot coal; specific gravity, 1·318; carbon, 67·6; hydrogen, 5·41; oxygen and nitrogen, 12·43; ash, 14·57; this analysis had been made by Mr. Richardson. He had received a good Newcastle gas coal from Mr. Nicholas Wood; this gentleman, on all matters connected with coal mining, was a great authority; it contained carbon, 83·73; hydrogen, 4·9; oxygen and nitrogen, 11·37, and was of a peculiar good quality for making coke. Newcastle steam coal, from the same gentleman, which caked in a different manner; this was composed of carbon, 80·54; hydrogen, 4·76; oxygen and hydrogen, 14·70. Another was the South Wales coal, from Tycernol, which was used in the Swansea smelting works; this had been obtained from the eminent firm of Messrs. Vivian; its composition was carbon, 89·43, hydrogen, 3·99; oxygen and carbon, 6·58; this was a perfectly free-burning and non-caking coal. From another Welsh colliery, Pentryffera, the carbon was 90·88; hydrogen, 4·32; oxygen, 4·80. He would now come to the Staffordshire, or 10-yard coal, and here each seam had its own denomination. That called the white coal consisted of carbon, 77·76; hydrogen, 4·72; and oxygen and nitrogen, 17·52. Another species was the Brassils, a well-known coal in Birmingham, and extensively employed in the reverberatory furnaces there; its composition was carbon, 78·10; hydrogen, 4·9; oxygen, 17·00; about 8 per cent. of white ash may be reckoned. Reducing this to a standard, estimating the carbon to be 100 parts, in one instance the oxygen and hydrogen would give 11·83; and in the other, to 100 parts of carbon, oxygen and hydrogen, 10·03. These were the composition of Welsh coals, which were non-caking. Another, which could be mixed with them, would cause an incipient caking; this contained carbon, 100; hydrogen and oxygen, 15·54. The Newcastle gas coal, which he had previously mentioned, and that peculiarly adapted for caking, contained, to 100 parts of carbon 19·43 of hydrogen and oxygen; and another, to the same proportion of the first element, 24·16 of the latter. With regard to the composition of the bituminous coal of Staffordshire, it was relatively as follows:—1. 100 carbon to 27·38 hydrogen and oxygen.—2. 100 carbon to 27·45 hydrogen and oxygen.—3. 100 carbon to 28·59 hydrogen and oxygen.—4. 100 carbon to 28·03 hydrogen and oxygen. These were all non-caking. By this they would see that coals containing hydrogen and oxygen from 15·54 to 24·16 would cake; those above, as in the instance of the Staffordshire, were non-caking. Specimens of the various descriptions of the several coals were then exhibited, and their peculiarities pointed out. He would next come to the composition of coal ash. That from Dowgas had given silica, 24·18; alumina, 20 82; oxide of iron, 26·0; lime, 9·38; magnesia, 9·74; sulphuric acid, 8·37; phosphoric acid, 0·21; sulphide of iron, 0·38. From Tyrceneol, 100 parts of ash had returned silica, 35·04; alumina, 28·01; peroxide of iron, 19·76; lime, 4·53; magnesia, 2·14; potass, 2·94. He had heard that a patent had been taken out for the purpose of rendering coal ashes that contained potash available for manure, and they would see how valuable this would be if from 100 tons of ashes they could obtain nearly 3 tons of potash; the remaining constituents of this ash were soda, 0·95; sulphuric acid, 7·14. He would now take the whole coal and ash together, in 100 parts, and this would give silica, 4·68; alumina, 3·74; peroxide of iron, 0·10; lime, 0·6; magnesia, 0·38; potash, 0·39; soda, 0·12; sulphuric acid, 0·54; iron, 1·71; sulphur, 1·96; carbon, 76·81; hydrogen, 3·42; oxygen and nitrogen, 5·65. It was necessary in every case to know the quality of the ash, as well as the nature of the coal, and it was always important in metallurgical operations that a good sample of the mineral should be obtained; by this he did not mean a specimen, and to this word sample he should often, during the course of these lectures, have occasion to allude. Many specimens from gold mines had been palmed off on the admiring public as average samples of the ores in the places from which, in too many instances, it was pretended they were extracted. The determining the quality of the ash was sometimes of great value, it being in such quantities, and so detrimental at times as to render it useless for many operations. Iron pyrites sometimes occurred in nodules or layers, and at others disseminated through the coal.

The lecturer then alluded to spontaneous combustion, which was so frequently occurring. They might have observed in some old coals a sort of yellow, rusty appearance, arising from the presence of the iron pyrites forcing its way through. Sometimes there is so great a proportion of oxide of iron, in the shape of iron pyrites, in the coal as to give the ashes a red colour; and if iron pyrites be in excess, it is often very destructive to the bars of the furnaces. The presence of this may be connected with the fusibility of the coal. Clinkers, which were coals fused (a stalactic specimen of which was shown), in many instances choked the furnace and lowered the temperature. In some parts—in Swansea, for instance—they are used with great success, and thick layers of clinkers there are made to answer the purpose of beds for the bottoms of the furnaces. A French metallurgist, who had made many observations about this, stated that they were so careful in Swansea with regard to this matter that they used the different ashes as a flux one to the other, and had subjected these to a careful chemical investigation. He had paid great attention to this when at Swansea, and his experience had proved there was not much variation in the constituent parts of the several ashes. The presence of inorganic matter, when not connected with iron pyrites, might be found useful, as the fuel burns slower, and does not collapse, and this was probably the reason why Brassils were used. Anthracite promises to be a very important fuel; in fact, it has already become so. The following were the characteristics of that from Pennsylvania:—Colour deep black, brittle; bright lustre, almost approaching to metallic; compact, and not soiling the fingers; fracture almost conchoidal; burns with greater difficulty than bituminous coal, except under certain circumstances. That from Lehigh, a specimen of which had been brought over by Sir Charles Lyell, contained carbon, 92·59; hydrogen, 2·73; oxygen, 1·61; nitrogen, 0·92; ash, 2·25. One from Glamorganshire was of the specific gravity of 1·375; its constituent parts were carbon, 91·44; hydrogen, 3·46; oxygen, 2·53; nitrogen, 0·21; sulphur, 0·79; ash, 1·52. So much for the organic part. He would now give an analysis of the ash, by the late Prof. Johnson:—Ash, 4·83; silica, 53·69; alumina, 36·61; peroxide of iron, 5·59; lime, 2·86; magnesia, 1·08; and oxide of manganese, 1·87. Anthracite had been used in their furnaces; it gives a great heat for a short time, in a limited space. Sometimes the bottom of a crucible would be heated to a very high temperature, while the upper part would be comparatively cool. It has been used very successfully, and is of great utility in the smelting of iron. One great disadvantage with it is, that it is subject to depreciation; when heated it flies into small pieces, and this has been found productive of considerable inconvenience when the furnace has been some time at work, as these small particles, when accumulated, impede the air. Several projects had been tried, but hitherto they had not been so successful as to obviate the difficulty, and if any of the gentlemen there could hit upon a plan to remedy this, he had no doubt they would not only do good to others, but likewise to themselves.

The subject of charcoal he should be very brief upon. Prepared at a low temperature, this is a comparatively bad conductor in power to that prepared at a high temperature. Its density bore a chemical relation to the density of the wood from which it was prepared. He had some further observations to make on this subject, which he would defer to another lecture. With regard to the properties of anthracite, there would be some future remarks to be made on it, when they came to iron smelting.

INSTITUTION OF MECHANICAL ENGINEERS.

The general meeting of members of this Institution was held on Wednesday, at the Institution, Birmingham,—Mr. S. LLOYD in the chair.

The SECRETARY (Mr. W. P. Marshall) having read the minutes of the previous meeting, several new members were elected, and the president, vice-presidents, and members of council, were nominated for the election at the ensuing annual meeting.

The first paper read was a "Description of Naylor's Improved Steam-Hammer," by Mr. CHARLES MARKHAM, of Derby.

In this hammer in addition to the steam being admitted underneath the piston to raise the hammer, as in the ordinary construction, it can be let on also above the piston, so as to increase the force of the blow given by the fall of the hammer, according to the pressure of the steam. This is effected by means of two cylindrical steam-valves, one at each end of the cylinder, fixed on the same spindle, the upper one having openings on opposite sides only; and by turning the valve round in its seating by a hand lever, the openings in the valve can either be made to coincide with those in the port, so as to admit steam upon the top of the piston to any desired extent, or can be so placed as to exclude the steam entirely from the top of the piston, as in ordinary hammers, thus working the hammer either double-acting or single-acting. The valve is worked up and down by means of rollers fixed on the hammer block, which, as the hammer rises and falls, strike against two projecting wedges, connected with the valve rod by levers; by adjusting the height of these wedges, the length of stroke of the hammer is regulated as desired. The adjustment of the wedges is effected by hand levers, instead of by the ordinary screw gear; the working can thus be altered quickly and easily, the valve being nearly in equilibrium, and offering little resistance to being moved. By admitting the steam above the piston, a much greater number of blows is obtained in the same time with this hammer than by the ordinary steam-hammers, giving the advantages that so much more work can be done at one heat, and the force of blow can be increased when required for large forgings. This hammer is also intended to be applied to rivetting thick plates of iron, in order to gain the advantage of quick light blows at first, with heavy finishing blows to complete the rivet.

The next paper was "On Lighting Railway Trains with Gas, with a description of Mr. T. J. Thompson's System," by Mr. J. KITSON, of Leeds.

The use of gas for this purpose possesses important advantages over oil, in the constant brilliancy of the light, saving in expense of lighting, and also saving by turning off the lights from unoccupied carriages; but the difficulties in practically carrying out the plan for employing it in railway carriages have hitherto prevented its adoption. The plan proposed in the paper is to have a travelling gas-holder in each train, fixed on the tender or the guard's van, the sides of the gas-holder descending in a narrow water space all round, avoiding the oscillation and weight of water that would attend the use of a large quantity of water as in the ordinary construction of gasometers. The supply pipe of each carriage is connected by a flexible tube with coupling joints, the couplings being constructed so that in the act of uncoupling, or in accidental breakage, the communication between the carriages is cut off, and the gas is thereby prevented from escaping; a flap-valve is placed at the gas-holder, preventing any return current of the gas in consequence of oscillations. The lights are kept in for a considerable time, when the carriage is detached and cut off from the gas-holder, by means of an elastic bag, which gradually contracts with a slightly decreasing pressure. The gasometers to supply the trains at principal stations are of ordinary construction, but having a shallow tank of water on the top, in order to give an increased pressure for forcing the gas rapidly into the travelling gas holder; the station gasometer is first filled from the gas main at the ordinary pressure, and the water is then let in to the tank on the top of the gasometer to increase the pressure. A model of the travelling gas-holder and specimen of the coupling were exhibited.

The last paper was a "Description of a Ventilating Apparatus for Buildings," &c., by Mr. SAMUEL THORNTON, of Birmingham.

In this apparatus, which is the invention of Mr. Charles Watson, of Halifax, the fresh air is introduced at the top of the building or place to be ventilated, allowing of its diffusion over the room as it gradually descends, and admitting of a simple arrangement being employed for the purpose of the supply and discharge of air, convenient of application and regulation. The ventilator consists of a vertical tube, divided into two passages by a central partition, with a regulating damper or valve at the bottom; one half of the tube rises slightly higher than the other, which is found sufficient to determine the passage of the heated air up through the longer, while the cold air passes down through the other. Two regular currents of air are thus maintained, and a continuous change of air is carried on, without objectionable draughts or currents of cold air. This ventilator has been successfully applied to drying-houses of dye-works, &c., and proves completely efficient in removing the constant vapour ordinarily experienced there; it has also been employed with advantage in ships, and found to preserve ventilation whilst the hatches were fastened down for several days during a storm.

After the meeting, a Hydraulic Engine, by Mr. DAVID JOY, of Leeds, was shown at work, designed to be used as a simple and convenient motive-power for several purposes where steam-power is objectionable, or not available.

SOUTH WALES INSTITUTE OF ENGINEERS.—In our last Journal we referred to the general meeting of the South Wales Institute of Engineers, and to the appointment of the officers for the ensuing session. It will be seen that the business passed off in a very satisfactory manner, no less than 74 members and one graduate having been enrolled. In another column we publish the list of the officers elected, all of whom being competent for the duties they have undertaken, are willing to use their utmost exertions to ensure the success of the institution. The president is Mr. Wm. Menalaus, of Dowlais, and the five vice-presidents—Messrs. Ebenezer Rogers, Abercarne; Wm. Adams, Ebbw Vale; W. S. Clark, Aberdare; G. Martin, Dowlais; and John P. Roe, Llynvi. The council is not less practical, consisting of Messrs. S. Truran, Dowlais; R. Bedlington, Rhymney; E. Williams, Dowlais; S. B. Rogers, Nant-y-Glo; D. Williams, Rhymney; J. Richards, Ebbw Vale; C. Peirce, Cyfarthfa; D. Roberts, Rhymney; R. H. Rhys, Aberdare; John Cox, Newport; — Huxham, Pont-y-pridd; and John James, Blaina. The treasurership is undertaken by Mr. Edward Brigden, Dowlais; and Mr. Edw. Williams, Dowlais, performs the duties of honorary secretary. The subscriptions are 2*l.* 2*s.* per annum for members and associates, and 1*l.* for graduates; so that the benefits of the institution are within the reach of all, and the very excellent provision is made that all who join before July, 1858, shall not be required to pay the 1*l.* 1*s.* entrance fee. We wish the institution as much success as has attended those of a similar character already in operation; and from the spirited manner in which the task of establishing it has been performed, we see no reason to anticipate the slightest failure.

INSTITUTION OF ENGINEERS IN SCOTLAND.—The first meeting of this institution was held in the Philosophical Society's Hall, Glasgow, on Oct. 28. The president (Prof. Rankine) delivered a very appropriate inaugural address, in which he explained the peculiar nature of the society, as distinguished from others of a scientific character. He remarked that scientific societies might be divided into three classes—those which promoted especially the advancement of science, keeping the members informed of the progress that it made, as the Royal and Geological Societies; those intended partly for the popular diffusion of scientific knowledge amongst persons whose ordinary pursuits were not of a scientific character, as the British Association, and the Philosophical Society of Glasgow; and those devoted to the improvement of practice, by keeping practical men informed of the experiments and improvements in science effected elsewhere, and collecting the results of their experience. This class of society differed from the others in respect of its aiming at the discussion of details of practice, which in the others were passed over as uninteresting or unintelligible to the general public. Their institution traced its origin to the meeting of the Society of Mechanical Engineers held last year in Glasgow, it being considered that a society of engineers holding its meetings in Scotland—and in Glasgow as the best mechanical centre—would be successful and highly advantageous. It combined mechanical and civil engineering, as both branches were now closely united by the extensive and increasing use of iron in building operations. The means of promoting the society's object, the advancement of engineering and practical mechanics lay in experiments; and as few engineers have sufficient time for this at their disposal, the institution would prove useful, and enable them to record, for the benefit of others, whatever discoveries they might incidentally make in the pursuit of their business. This was a period of an economy that endeavoured to accomplish an end, by means just sufficient to do so, in the most scientific and serviceable manner, and no more. It was usual, in an opening address, to touch upon the history of, and improvements made in, that art or science with a view to which the society was established; but he thought it would be much better if, instead of looking back on what had already been accomplished, he should point out some of the more important subjects on which knowledge was required. One of the principal of these was that of materials. The strongest and weakest iron being itself always just the same in substance, the interesting question arose—Can iron produced in our country be so improved as to remove the materials that deteriorate its strength? That was an important matter, upon

which the society would afford the means of throwing light by collecting the experiences of its members. There were other materials of importance, as the seasoning and preserving of timber, the hardening of stone, the stiffening of suspension bridges, the electro-magnetic engine, &c. He then commented upon the vast field for operation which the society had before it; and the advantages of the locality where it is established. After some remarks upon Whitworth's decimal system, a paper on Beaufume's gas flame furnace (which was referred to in the *Mining Journal* of Oct. 17) was read, and a vote of thanks being awarded to the Chairman, the meeting separated.

CORNISH MINE PHOTOGRAPHS—No. XIX.

"THE BAL SELLER."

I have long waited a favourable opportunity of depicting an authentic specimen of this *genus homo*—a real, genuine "bal seller," such as exists more frequently in imagination than reality; one who offers a mine for the purposes of pure deception and robbery, and nothing else; whose whole argument is a "slocking stone," and whose sole ability consists of lying and unblushing impudence: such a man, in one instance alone, does infinitely more mischief than twenty able and good men can repair in twenty years. Fortunately, the facility with which localities can now be visited prevents or checks any such proceedings for any length of time, as proprietors and intending shareholders can easily ascertain, by themselves or their paid agents, whether the leading facts of the case are so or not. The *Mining Journal* now is the Ægis of protection against such frauds; for were they now attempted to be foisted on the public, its columns, from some correspondent or other, would be sure to unmask the humbug, and expose the perpetrator. But to our subject—the "bal seller." As truth is sometimes libel, and as we have no wish to figure in a court of justice, like the subject of our paper, we shall use the author's privilege, and, whilst detailing facts, keep the initial incog.: to hundreds the subject is painfully patent, having been ruinous.

Well, then; on the estate of P—— is situated a mine, which was first wrought by intelligent captains, who executed extensive works, but having no less than five or six other mines in hand, at a time of great monetary derangement, found it necessary to discontinue operations; this was accordingly done, entailing a heavy loss. This was the very chance for the "bal seller," who proceeded as follows:—It should be mentioned he was the son of a Cornish mine captain of a very different turn of mind and disposition, but had settled in London for some time as a broker. Hearing of this mine, then called E—— S——, he called on a person at T——, whom he well knew had lost a considerable sum in the last adventure, and offered him a liberal share in a new company he undertook to form, provided he would give him an introduction to the proprietors. As a drowning man is willing to catch at a straw, so was this gentleman eager to embrace such an apparently great advantage. The two gentlemen posted off at once for P——, and obtained the desired interview with the lord of the manor. He was completely deceived by the gentlemanlike, off-hand manner, of the London broker, whose appearance, being handsomely dressed, and profusely decorated with jewellry, highly pleased him. Being accompanied by a late shareholder, he had no hesitation in promising him the grant of the sett, provided 50*l.* was paid down for the lease and expenses. This was at once done by the two gentlemen, who paid 25*l.* each. The plans of the extensive estate and mine produced, samples of ore raised shown, glasses of wine discussed, as well as things in general, when the landlord asked, "Will you not go down to the mine and see for yourself, Mr. R——?" "No, I do not want to see the mine; I've got a stone of one or two and the maps, that 's enough for me. I don't care a d—n about seeing the mine; I'll get a company to work it, and that's enough for me and for you." To the landholder's surprise, they left the estate immediately after.

The "bal seller" started next day for London, after agreeing with his friend at T——, that whatever profit was made should be equally divided. Arrived in town, the "bal seller" at once went to work. Being known to be from, and largely connected with, Cornwall, he had little difficulty in obtaining credence from some gentlemen, to whom, as an especial favour, he displayed the glittering treasures. What could be more satisfactory? There were the ores, the maps of the estate, the plans of the mine, the copy of the grant, sufficient reasons for its previous abandonment, and one-half of the mine taken up in Cornwall. Now, reader, mark! he stated one-half the mine, not the profits! Could anything be fairer, or more open-handed? Nothing. First one gentleman went in, then another, until all went on as merry as a marriage bell. The broker (again now) had pocketed 1000*l.* for half the mine, set up his carriage, got on the Stock Exchange, and was considered a rising man. A magnificent house, handsome equipage, and swaggering gait, were his; well-furnished offices, in a good situation, were his also. Hearing of all this in Cornwall, his T—— friend came to town to see how matters stood. He was received and politely treated with unbounded hospitality, introduced on 'Change, and shown that but half the mine was disposed of. After spending 20*l.* or 30*l.* with his dear friend the stock-broker, in seeing the lions, &c., he returned, to T——, perfectly satisfied that he had at last found a really independent, honest fellow. Soon afterwards, coming to town, he found his quondam friend in the Queen's Bench, and was sued for 1000*l.*, as his half of the mine, being entered for that share in the pretended cost-book. The only way of getting out of the mess was by bankruptcy, which he endured, and was thus ruined.

Not a shilling was ever laid out on the mine. The period of our description runs over eighteen months. The landlord was quiet for six months, during which time the grant extended, by continued assurances from the broker and his friend, that a capital company was being formed, who would develope the mine fairly and fully. At length he, too, became tired out with promises, and desired to know when work was about to be commenced. His letters became more urgent and imperative, when a reply to one of his letters stated he might go to the d—l if he liked, as the thing was all one to the broker. He could get a "bal" anywhere, and call it E—— S——, and it would be all the same to him. Disgusted with such a knave, he revoked the sett; yet the broker went on selling shares, until we find him in prison, as described.

One step in crime is sure to be followed up in quick succession by another. We next see our hero (for as one murder makes a villain, and thousands a hero, our criminal is fully entitled to the distinction) at Liverpool, playing the same game over again, but with rather diminished success, still with sufficient adroitness to be in the possession of considerable property, and lo! to marry a wife with very good connections and large property. This, of course, gave him an extended field of action, which he failed not to use with good effect. His wife's property was partially setted on herself, but what was not soon went off in extravagance and knavery; not a shilling of all the large sums he received was ever laid out in the mines he pretended to sell; yet losses like these are set down as incurred by ruinous mining—*pro phudor*. Like means produce like effects; he was again imprisoned, but after a period of some months was again released. We now lost sight of this worthy for some years, as he was hybernating on the plunder he had secured, and on his wife's narrow jointure. We next see him in public at Hull, again in full feather—a fine suite of offices, good house, wine and boon companions. Attractive advertisements brought plenty of business, and had he been anything like honest he might have done well as a broker; but "bal" selling was his evil genius, and that attended him like his shadow on a sunny day. He had too great a temptation put in his way by success; he tried a "bal" scheme, and got plenty of money, but alas! none went to the mine. One fine morning he was missed, and the "bal" found to have no existence. We now lose sight of him again for three or four years, when we find him figuring as an insolvent in Lancashire. The places of residence enumerated in his schedule were above forty, plainly showing by the brevity of time at each that there was no resting-place for him. Being remanded for two years, we presume he is still confined in —— Gaol—a fit reward for such a villain. It has been calculated he had received upwards of 4000*l.* from his "bal" selling speculations alone!

One of his dupes in the E—— S——, hearing the mine was being reworked subsequently as the P—— Mine, took a journey from London to the spot, and, finding it was actually the case, waited on the landlord, and stated he had paid the "bal seller" 500*l.* himself, for which he only received a worthless scrip and one piece of ore, about the size of a walnut. Though so severely robbed, he laughed at his own credulity, but did not condemn mining, and again embarked, with great success—as great, he has told us, as he could wish. His own words on the subject are—"I was a fool, but experience teaches me it was the best 500*l.* I ever laid out. I now see ere I buy: I lay out 10*l.* to examine, before I invest 500*l.* By doing so I have gained many 500*l.*, and laid the foundation to gain many more." We hope "Fides" is satisfied with our portrait. As he is critical as to colour, we hope the "black" and "*done* brown" will please his taste; if it come not up to his idea of a "bal seller," we will try again. As we have before said, we waited our opportunity, and can warrant the truth of the picture. We write this page in the very room in which the E—— S—— transaction took place, having come hither that we might have the exact particulars. The rest we know from experience.

Many will ask, for what purpose are such pictures presented? We answer, they are necessary as a set-off, to contrast the good, and to warn unwary purchasers against "brokering bal sellers," whose only qualifications are unbounded impudence, ignorance, and knavery; to see for themselves what they purchase, and to know the character of the men to whom they confide their money; to see that it is laid out in the development of the mine, and not to trust to flattering letters, that all is going on satisfactorily; or to purchase bits of worthless scrip or "slocking stones;" not to be taken by a well-dressed exterior, splendid equipage, or profuse hospitality; to value man, not appearances; and learn to judge the difference between a worthy mine captain and a knavish "bal seller," and we shall hear far fewer complaints against Cornish mining.—GEORGE HENWOOD.

THE MINERAL WEALTH OF THE UNITED KINGDOM.

LEAD AND SILVER.

The total quantity of lead ore raised from the mines of the United Kingdom was 101,997 tons 15 cwts. This yielded of lead, 73,129 tons; from which there was separated, according to the returns furnished to the Mining Record Office, of silver, 614,188 ounces. The prices given for lead ores at the Holywell sales, the mean average of which very fairly represents the prices of lead ore over all the districts, were as follows:—

The highest price during the year ..... per ton	£18	12	6
The lowest price, excepting for a few small parcels of very poor ore	10	0	0
The mean average price	14	8	0

The value of the lead ore produce of the United Kingdom for the year 1856 may be estimated at 1,431,509*l.* The prices of pig-lead in the metal market were as follows:—

The highest price during the year ..... per ton	£26	0	0
The lowest price	22	0	0
The mean average price	24	0	0

The market value, therefore, of the lead produced was 1,755,096*l.* The value of the silver, at 5*s.* per ounce, was 153,547*l.*

Foreign silver ores imported and sold, 6636 tons, containing of pure silver, 1,748,735 ounces.

Summary of lead and silver produce:—

		Lead ore.		Lead.		Silver.
England—Cornwall	Tons	9,973 13		6,597 4	Ozs.	248,436
Devonshire		3,138 3		2,000 5		77,456
Somersetshire		750 0		500 0		—
Shropshire		4,407 19		3,228 15		—
Derbyshire		9,524 10		6,261 5		—
Yorkshire		12,174 7		8,986 2		302
Westmorland		2,923 16		2,179 1		23,860
Cumberland		7,311 8		5,321 1		51,931
Durham and Northum...		24,125 7		17,674 11		79,924
Wales—Glamorganshire		—		—		—
Carmarthenshire		1,280 9		932 5		—
Cardiganshire		8,560 1		6,191 10		38,751
Radnorshire		12 14		8 8		—
Montgomeryshire		1,723 17		1,349 5		2,660
Merionethshire		349 10		266 5		572
Denbighshire		3,103 15		2,367 10		1,034
Flintshire		4,607 5		3,513 0		19,340
Carnarvonshire		237 1		163 6		—
Isle of Man		3,217 18		2,450 10		60,382
Scotland		1,931 0		1,416 12		5,289
Ireland		2,483 17		1,602 5		3,703
Sundries under ten tons		161 5		120 0		550
Total		101,997 15		73,129 0		614,188

ZINC—SUMMARY OF RETURNS.

Cornwall	Tons	2,316	4	3	£ 4,133 6 0
Devonshire		660	16	2	1,711 8 6
Cardiganshire		1,096	9	0	3,943 2 0
Isle of Man		3,000	2	2	10,500 0 0
Cumberland		378	5	0	1,405 9 0
North Wales		1,551	15	0	5,752 0 0
Total		9,003	12	3	£27,445 5 6

IRON MANUFACTURE.

The total quantity of Pig-Iron manufactured during the year 1856 was 3,636,377 tons, the produce of the following number of blast furnaces:—

England	Tons	324
Scotland		127
Wales		171
Total		622

Total produce of pig-iron in Great Britain in 1856:—

Northumberland and Durham	Tons	331,370
Yorkshire		275,600
Derbyshire		106,960
Lancashire and Cumberland		25,530
Shropshire		109,722
North Staffordshire		130,560
South Staffordshire and Worcestershire		777,171
Gloucestershire		24,132
North Wales		47,682
South Wales (anthracite districts)		62,400
Ditto (bituminous districts)		814,750
Scotland		880,500
Total produce of Great Britain		3,586,377

MARMATO MINES OF THE MARIQUITA AND NEW GRANADA CO.

CONTINUATION OF NOTES, BY "VERITAS."

In the year 1824, the works of the Old Columbian Mining Association at Marmato were commenced, pyrites obtained in abundance, stamping mills erected, &c. The method at first adopted for gathering the gold from the stamped ore was partly that used for collecting the produce of tin ores; consequently the pyrites were stamped only once, the ore passing through a grate. The mine continuing to produce pyrites abundantly, new mills were gradually added; but as the moving power, the water, at such an elevation for the most part was dependant on the rain, in the dry season water was scarce. During the first two or three years there were only from 25 to 30 stamps at Marmato, but the power for reducing the ores was increased gradually, so that 50 stamps were at work in 1833, and in 1843 about 75 heads; and though the nature of the ore, and further the duty of the stamps, interrupted during the dry season, do not admit of an exact calculation with regard to the quantity of ore stamped, an approximate estimate of the pyrites reduced by the stamps during the first 20 years—up to 1844—would give the following results; for allowing only 15 tons as the average amount of pyrites reduced by each stamp per month, the 25 stamps, for the first nine years, would at this rate have pulverised ..... Tons 40,500
The 50 stamps during 11 years, at the same rate 99,000

Thus the pyrites reduced during the first 20 years gave a total of... 139,500*
And although such a considerable quantity of ore was brought into the shape of sand, and treated in different ways, only a few months out of the aforesaid number of years gave a profit, and equally few were those that even balanced the monthly expenditure.

The productivity of the ore was certainly most fluctuating, as a few tons might give from 20 to 40 ozs. of gold per ton, when others did not give from 2 to 4 ozs.; whilst the greatest number of the tons of pyrites raised would yield from one-half to one-eighth of an ounce of gold, still there never failed on an average from 10 to 15 dwts. to the ton of ore. Under such circumstances, it will appear strange to any one acquainted with the expenditures for working the auriferous deposit of Marmato, that no profit was obtained, but that, on the contrary, a loss of 200,000*l.* had become the ultimate result of the mining enterprise at Marmato from the year 1824 to 1848. Early in 1849, a favourable crisis took place; and by attending to the past operations and management at Marmato, the true reasons will be found for the extremities of loss and profit from the auriferous pyrites.

We shall, in the first place, then observe on the treatment of the Marmato ores during the 25 years of loss.

It has been already stated that the pyrites were stamped only once, and the pulverised ore treated nearly in the same way as the tin ores in Cornwall, the miners and dressers being experienced men from that part of England. Experiments made on the pyrites had proved that the gold particles were most diffusedly distributed among the mundic,† which sometimes gave rich and at other times very poor results, by trials made on a small scale; and singularly to say, the produce from a pound or two of ore, treated with great care, would never correspond with that from the dressing from the mills. A certain apprehension naturally arose from these facts; and the London board, in their "pyritical dilemma," wishing to improve the Cornish system for concentrating the Marmato gold, did in the year 1826 direct a person of scientific knowledge to be engaged, who happened at the time to be in Bogota, and the following were the results of his scientific and analytical investigations, with the view of settling the important question about the best method of collecting the highly diminutive gold particles out of the pyrites. It was resolved—

1.—To calcine the ores,‡ thus preparing them for the stamping process, it being settled that, previous to being stamped, the roasted ores should remain exposed to the atmosphere, when some part of the gold would disengage, making it free to some degree.

2.—The concentration of the pulverised ore to be performed, so as to collect not only the free gold but also the heavier mineral and metallic compounds containing gold.

This process would gather the free gold, when the remainder would be brought to the arrastres.

3.—The concentrated heavier sand, containing gold, to be treated by the arrastre, or Mexican process for amalgamating silver ores.

These were the three cardinal points on which the reduction of the Marmato pyrites would be effectuated. The process of calcining was attended with great expense, the firewood demanded heavy outlays, every stick had to be brought by men (employed for the purpose) from a great distance. Great, too, was the expense in removing the ore from different levels to one or two plane spots where the calcination took place, when, after being roasted, the ore had to be anew carried down to the mills for grinding. The concentrated ores had also to be brought from the dressing-floors up to the quicksilver mills, or arrastres. During the necessary preparation of materials for the mills and the arrastres, these latter were constructed at great outlay. The motive power being mules, more than 100 mules were, therefore, required for moving the ore and the sliders of the arrastres. The maintenance of these animals came to from $30 to $40 a day, to which must be added the expenses of their attending staff. Great quantities of quicksilver entered further among the losses, and though great attention was given to the process of amalgamation, the amalgam did never correspond to the assays made on the ores prepared for the arrastres, as hardly above 50 per cent., comparatively, was ever obtained. Still it was thought the best means of obtaining the gold from the pyrites; for although by assays it was now and then observed that the quicksilver did but attract a certain portion of the auriferous contents, yet as "Von Born, and a few others, recommended the process with mercury for the extraction of the precious metals," it was at that time thought the best of known methods. In the year 1832, a mining officer from Hartz was engaged, and considerable improvement attended to in the underground works, and a permanent water-course commenced. In 1836, the writer happened to pass through Marmato, and upon a very natural observation made upon the inefficacy of the quicksilver process, recommended the use of woollen cloth, as practically known for its utility. To this it was replied by the party in charge, "that the amalgamation had been introduced by a person of scientific knowledge, and was considered at home among the best means for this kind of ore; but with regard to the 'baize,' it had been tried without benefit." But the writer replied, "Do you know whether a proper declivity has been attended to? because without that a favourable result will not be obtained." An affirmative reply was given: nevertheless, a new trial of the woollen cloth was recommended. The only real improvement then introduced was the re-stamping, &c. At this time, however, the ore certainly had arrived at its highest point of productivity; 90 lbs. of fine gold and 65 lbs. of fine silver had just been packed and sent to London, being the produce for the month of June, showing the prevailing alloy of about 14 carats.

A new scheme was then inspected, as introduced by the chief mechanic. It consisted in a considerable number of hoppers of large capacity (like those used for flour mills), which were to receive the stamped ores in their moist state; by receiving a knock, these hoppers had to discharge their contents into the concentrating tyes, each of which was attended by a person moving a rake, for spreading equally the ore for concentration. But although at first sight the invention seemed to be of use, after some reflection it would appear that "wet sand" being the reverse to dry, the consequence of a blow on the hopper would produce an effect contrary to what was desired, as moist sand would become more solid by each movement of the box enclosing the same. After some time the hoppers and their moving machinery were completed, but at the very first blow given the sand became immovable, and not leaving the hopper no materials appeared in the pit, thus presenting a dead failure.

[*To be continued in next week's Mining Journal.*]

* This profitless grinding of pyrites having continued until the beginning of 1849, gives an addition of 4½ years more of the consumption of ore; thus the 75 stamps, at the same rate per month, would have bruised down 60,750 extra tons.

† The Cornish tin dressers knew that the mineral compound they term mundic produced the gold particles by pulverising; still they could not make out "the nature of this new kind of stuff."

‡ Nothing new was introduced by the roasting of the pyrites, which all over the civilised world are roasted, with the view of accelerating decomposition. But the question is, Will it pay?

FOREIGN VINEYARD ASSOCIATION.

The half-yearly meeting of shareholders was held at the offices, 190, Regent-street, on Thursday, Oct. 29,—Dr. ALEXANDER BEATTIE in the chair.

The SECRETARY read the notice convening the meeting, and the minutes of the last, which were confirmed. A report was then read, of which the following is an abstract:

The directors had great satisfaction in issuing their seventh report upon the affairs of the association, accompanied by a statement of accounts for the past six months, ending Aug. 31 last. In their last report, the directors alluded to the ordeal through which all those engaged in the wine trade have had to pass. However, two further augmentations have taken place, caused by the great scarcity in the wine-growing countries of France, Spain, and Portugal; nevertheless, the same tariffs have been maintained by this company to customers. The vintages of 1857 are deficient in quantity, though superior in quality. During the past six months, the directors have the gratification to announce they largely increased their customers, including four large and important steam navigation companies. The present six months' sales have exceeded those of the same months of 1856 by 5500*l.*, and of 1855 by 9000*l.*, nearly 50 per cent. over the second year's operations. The total nett profits now standing to credit amount to 3529*l.* 12*s.* Two directors accompanied the manager to Bordeaux and the vineyards in September last, and from their report the board have the highest confidence in the future position of the association. The directors recommend that a dividend of 10 per cent. per annum, with a bonus of 2 per cent. per annum, be declared for the six months.

The CHAIRMAN observed, in moving the adoption of the report, they could see by the balance-sheet that the returns were of a most satisfactory nature. They had to encounter a great competition, and he believed that, as a company, they had worked as energetically as any individual wine merchant could have done. In the report which had been read to them, they would perceive there were 232 shares which were still unissued; these had been taken at the premium of 5*l.* per share. The proprietors of the Rausan estate had experienced some difficulty, owing to the contract with this company, but this had been satisfactorily arranged.

MR. HENTY enquired whether the bad debts were written off periodically, or if at some future time they might see them as a large item in the balance-sheet?

The CHAIRMAN observed that the bad debts were written off every half-year, as it was the wish of the directors to afford every information to the shareholders. They had not thought it necessary to publish a profit and loss account, a company of this nature being always subjected to competition. The profit and loss sheet was at all times open to the inspection of every shareholder. The operations of the company had, since the last meeting, shown a handsome return.

Col. OLDFIELD said that he must congratulate the shareholders on their increased prosperity; he, therefore, proposed that a dividend should be declared at the rate of 10 per cent. per annum, with a bonus at the rate of 2 per cent. per annum.

This was seconded by Col. HAMMILL, and unanimously carried.

A question then arose as to the auditors' remuneration, and, after some discussion, it was resolved that the sum of fifteen guineas should be voted to Mr. Heath, and five guineas to Mr. Foster, for their services.

Mr. STAPLETON observed that, perhaps, he was out of order in obtruding himself before the meeting on this occasion; the report had mentioned the increase of business they had obtained. It was necessary that honour should be rendered where it was due. The Chairman had worked most energetically for them. He had introduced their wines in places where he had to encounter a strong opposition; he, therefore, proposed that the shareholders should present him with a claret jug, as a testimonial of their esteem, and some slight token of recognition of his services.—This was put, and carried by acclamation.

The CHAIRMAN observed that, grateful as he was for this expression of feeling, and knowing there were many precedents in favour of such testimonials, yet he must decline it; he was totally averse to it, and on the day previous he had opposed a sum of money being granted. It was not right that any joint-stock company should appropriate any of their funds for such purposes; a single shareholder not present might protest against it, and in point of law the whole resolution might be invalidated. He was aware such things had been done; he, however, grateful as he was for the expression of feeling, would be no party to receiving such a testimonial out of the proceeds of the company; it was invidious, as his colleagues were equally worthy.

Col. OLDFIELD observed that their Chairman had exerted himself greatly on behalf of the association. As he had refused to accept a claret jug from the association, he proposed that each of them should individually subscribe to present him with a testimonial, as a recognition of his services.—This was seconded by Mr. PALMER, and unanimously carried.

A vote of thanks to the Chairman was then moved by Mr. GABRIEL, and seconded by Mr. TURNER; this being carried, the business of the meeting terminated.

JOINTS AND CLEAVAGE.—At the Royal Cornwall Polytechnic Society meeting a note, with an explanatory drawing representing the cliff at Beechy Head, from Mr. Enys, was read. Here the upper part has perpendicular joints, with beds of flints, while the lower part has oblique joints, without flints. Mr. Enys contended that rocks bounded by joints of all formation had more or less a tendency to assume forms of the same character as their former divisions—that the larger were types of the smaller, which might be considered as geological units, like crystal units, which could be obtained by subdivision. Mr. R. W. Fox was of opinion that in most cases the slaty cleavage of rocks was produced by deposition, and agreed with the stratification. But in very many instances, it was found that the cleavage does not conform to the beds of the rocks. In these cases it was supposed by many scientific men that the cleavage was produced by mechanical pressure perpendicular to the planes of cleavage; while others were of opinion that it was in part due to crystalline or occult forces existing in nature. There were most able advocates in favour of the theory of mechanical pressure; and in some cases there was much to be said in its favour; especially the frequent distortion of organic remains found between the *laminæ*. Experiments had shown that plumbago, bees-wax, and other substances under pressure, would produce lamination. Where the component parts were of scaly or micaceous form, he could easily imagine that pressure would effect lamination; but it was very difficult in this way to account for the *smooth* jointed structure and divisions of rocks across the planes of cleavage at various angles—often in slates and shales assuming nearly symmetrical forms, commonly more or less rhomboidal, even in their minor divisions. The shales of a coal-field would be found to have a great tendency to assume the rhomboidal form—as well as some of the ironstone interstratified with them; whilst the coals in the intervening coal-beds, which had been subject to pressure equally with the shale-beds, had their joints of a rectangular form. To show that other adequate forces analogous to those which produce crystallisation exist in nature, reference was made to some of the phenomena existing in Cornwall; such as the difference between the quartz of cross-courses and the quartz of east and west lodes—the one being generally solid, while the other was commonly more or less striated; the definite arrangement and deposition of ores in the lodes—in some mines, lodes were found to be most productive in granite; in others, in clay-slate or killas; and in others, in elvans or porphyry. So that the deposition of ores did not seem to depend on the chemical character of rocks, but on some higher and more general causes. In some of the lead mines in the north of England, lead ores were found in limestone, but ceased entirely in sandstone; whilst in other neighbouring mines lead had been found in sandstone, and it altogether ceased in the limestone. This seemed to show that there were definite forces in action in the earth, which affected the mineral deposits in rocks, independently of the chemical nature of these rocks. Some of these facts had been referred to for the purpose of showing the existence of hidden forces which had operated in determining the structure of rocks; and he thought the paper which had been received that day from Mr. Enys went to maintain that view. It was a matter of great interest both to mining and to science generally; and he thought miners might greatly aid the solution of these questions by the communication of facts coming under their notice. He should also like to know, in cases were the walls of mines were polished, whether the surfaces so polished were plain or irregular. They were often found to be striated or scratched; and he had observed in Wales, instances where a high polish had been produced on the sides of a fault, and yet those sides were not flat, but, on the contrary, very uneven horizontally and perpendicularly. In such cases it was evidently impossible that the polish could have been produced by the friction of the two rocks. It would be very interesting to receive from miners any facts connected with the polished rocks of mines, and, particularly, whether the surfaces of such rocks were flat, or irregular, having protruding and receding surfaces.

* It was in this year, 1836, that a solitary dividend of 10*s.* per share was paid to the shareholders of the Old Columbian Mining Association.

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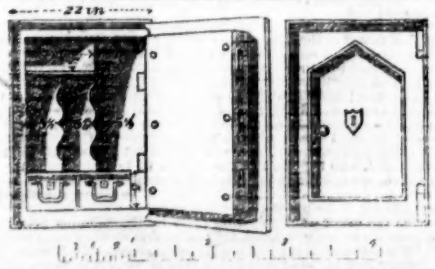

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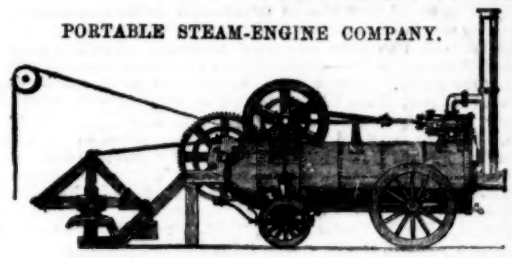

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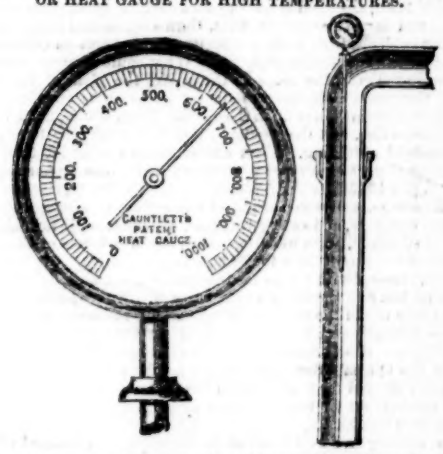

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